



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
325 Broadway
Boulder, CO 80305-3337

December 26, 2020

Liang Chen
Suzhou Metal Services Co., Ltd.
No. 125 Yinsheng Road
Suzhou, Jiangsu 215126
China

Dear Mr. Chen:

Charpy verification specimens tested on the 300.0 J (221.3 ft-lbf) capacity Suns Machine, Serial No. PTM160106, have been received for evaluation along with the completed questionnaire. We have analyzed the results (see attached table) and find that the average values fall within the acceptable ranges at all the energy levels tested, in accordance with the current ASTM E23 standard. The following paragraphs describe further analysis of the questionnaire, the test results, and the fractured specimens.

This machine satisfies the indirect verification requirements of the current ASTM E23 standard from an absorbed energy level of 2.5 J (1.8 ft-lbf) to 80 % of the maximum capacity of the machine.

Enclosed is a Charpy Verification Sticker to attach to your machine.

If the machine is moved or undergoes any major repairs or adjustments, this verification becomes invalid and the machine must be rechecked (see ASTM E23). If a specimen stops the pendulum during a test, the machine should be checked to assure that the pendulum is straight, the anvils and striker have not been damaged, and that all bolts are still tight.

If you have any questions concerning the verification of your machine, you may contact me by phone at +1-303-497-3351, by fax at +1-303-497-5939, or by email at charpy@boulder.nist.gov.

Sincerely,

Raymond L. Santoyo
Applied Chemicals & Materials Division

3 Enclosures

National Institute of Standards and Technology
 Applied Chemicals & Materials Division
 325 Broadway, Boulder, CO 80305-3328

Facility: Suzhou Metal Services Co., Ltd., No. 125 Yinsheng Road
 Suzhou, Jiangsu 215126 China

Machine Manufacturer: Suns Serial Number: PTM160106

Test Date: 12/25/2020

Reference Standard: ASTM E23

SERIES NUMBER	PT* Code	CLIENT VALUES					UNITS	AVERAGE (J)		DIFFERENCE	RESULT
		1	2	3	4	5		CLIENT	NIST		
Low LL-168	93274	14.2	15.9	16.1	15.4	15.1	J	15.3	15.3	0.0 J	Pass
High HH-172	93275	103.0	102.0	110.0	110.0	105.0	J	106.0	105.7	0.3%	Pass
Super-High											N/A

Allowable difference is 1.4 J or 5 %, whichever is greater.

N/A = commercially not available.

* Proficiency Test (PT) results for your data are available online. To access the PT data, you need to go to the [PT website](#) and enter the Series Number and PT Code for each energy level of interest.

Additional Information

The information contained in Table 1 can be used to compute the uncertainty for a new material tested in your laboratory using the procedure outlined in NIST SP 960-18 [1].

See also: <https://www.nist.gov/programs-projects/nist-impact-verification-program>.

Table 1. Summary statistics for SRM materials and customer's verification test result.

Series Number	Client Statistics					NIST SRM Statistics			
	Client Average \bar{V} (J)	Standard Deviation S_V (J)	Number of Tests n_V	$S_V / \sqrt{n_V}$ (J)	Degrees Of Freedom df_V	Certified Reference Value R (J)	Combined Uncertainty $u(R)$ (J)	Degrees Of Freedom df_R	Expanded Uncertainty U (J)
LL-168	15.3	0.75	5	0.34	4	15.3	0.078	66	0.156
HH-172	106.0	3.81	5	1.70	4	105.7	0.425	69	0.848

The fifth column, labeled $S_V / \sqrt{n_V}$, is the uncertainty of the verification test mean, \bar{V} , if there are no additional sources of systematic error that need to be included. It is the customer's responsibility to determine the final uncertainty of \bar{V} .

The expanded uncertainty of the NIST reference value (U), corresponding to a 95 % uncertainty interval, is based on a coverage factor from the Student's t distribution with df_R degrees of freedom. The expanded uncertainties include sources of error in the measurement and testing process at NIST, and are not the expanded uncertainties of the individual verification specimens or the uncertainties of tests performed in your laboratory.

Reference

- [1] Splett, J. D., McCowan, C. N., Iyer, H. K., Wang, C.-M., "NIST Recommended Practice Guide: Computing Uncertainty for Charpy Impact Machine Test Results," NIST Special Publication 960-18, September, 2007 (available at: https://www.nist.gov/sites/default/files/documents/mml/acmd/structural_materials/SP9602-18Final-2.pdf).

NIST Charpy Verification Sticker

This machine meets the indirect verification requirements of the current ASTM Standard E23

Machine Serial Number: *PTM160106*

Verification Date: December 25, 2020

Range of Verification: *From 2.5 J (1.8 ft-lbf) to 80% of the machine capacity*

Signature: *Raymond Santoyo*

Raymond Santoyo, Charpy Program Coordinator
National Institute of Standards and Technology